**Computer Science Key Stage 4 Curriculum Map (OCR J277 GCSE Computer Science)**

**Year 10**

| **Autumn 1**  | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| --- | --- | --- | --- | --- | --- |
| **Components covered:**1.1 – Systems architecture2.2 – Programming fundamentals (as part of Python programming) | **Components covered:**1.2 – Memory and storage2.2 – Programming fundamentals (as part of Python programming) | **Components covered:**1.3 – Computer networks, connections and protocols2.2 – Programming fundamentals (as part of Python programming) | **Components covered:**1.4 – Network security2.2 – Programming fundamentals (as part of Python programming)2.4 – Boolean logic | **Components covered:**2.2 – Programming fundamentals (as part of Python programming)2.5 – Programming languages and Integrated Development Environments | **Components covered:**2.2 – Programming fundamentals (as part of Python programming) |
| **Sub-Topics:**1.1.1 Architecture of the CPU1.1.2 CPU performance1.1.3 Embedded systems2.2.1 Programming fundamentals2.2.2 Data types | **Sub-Topics:**1.2.1 Primary storage (Memory)1.2.2 Secondary storage1.2.3 Units1.2.4 Data storage1.2.5 Compression2.2.1 Programming fundamentals | **Sub-Topics:**1.3.1 Networks and topologies1.3.2 Wired and wireless networks, protocols and layers2.2.3 Additional programming techniques | **Sub-Topics:**1.4.1 Threats to computer systems and networks1.4.2 Identifying and preventing vulnerabilities2.2.3 Additional programming techniques2.4.1 Boolean logic | **Sub-Topics:**2.2.3 Additional programming techniques2.5.1 Languages2.5.2 The Integrated Development Environment (IDE) | **Sub-Topics:**2.2.3 Additional programming techniques |
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| **Assessment:** End of unit tests.PPE examsProgramming tasks | **Assessment:** End of unit tests.PPE examsProgramming tasks | **Assessment:** End of unit tests.PPE examsProgramming tasks | **Assessment:** End of unit tests.PPE examsProgramming tasks | **Assessment:** End of unit tests.PPE examsProgramming tasks | **Assessment:** End of unit tests.PPE examsProgramming tasks |
| **Builds upon:** Hardware and Networks unit covered in Year 8 | **Builds upon:** Data Representation unit covered in Year 9Hardware and Networks unit covered in Year 8 | **Builds upon:** Hardware and Networks unit covered in Year 8  | **Builds upon:** Hardware and Networks unit covered in Year 8 | **Builds upon:** Python programming covered in year 7, 8 and 9 | **Build upon:** Python programming covered in year 7, 8 and 9 |
| **Introduces:** * Von Neumann architecture
* CPU registers
 | **Introduces:** * Different types of secondary storage
 | **Introduces:** * The Internet as a worldwide collection of computer networks:
	+ DNS (Domain Name Server)
	+ Hosting
	+ he Cloud
	+ Web servers and clients
* Star and Mesh network topologies
* Encryption
* IP addressing and MAC addressing
* Networking Standards
* Common protocols including:
	+ TCP/IP (Transmission Control Protocol/Internet Protocol)
	+ HTTP (Hyper Text Transfer Protocol)
	+ HTTPS (Hyper Text Transfer Protocol Secure)
	+ FTP (File Transfer Protocol)
	+ POP (Post Office Protocol)
	+ IMAP (Internet Message Access Protocol)
	+ SMTP (Simple Mail Transfer Protocol)
* The concept of layers
 | **Introduces:** * Types of networks:
	+ LAN (Local Area Network)
	+ WAN (Wide Area Network)
* Factors that affect the performance of networks
* The different roles of computers in a client-server and a peer-to-peer network
* The hardware needed to connect stand-alone computers into a Local Area Network:
	+ Wireless access points
	+ Routers
	+ Switches
	+ NIC (Network Interface Controller/Card)
	+ Transmission media
* The Internet as a worldwide collection of computer networks:
	+ DNS (Domain Name Server)
	+ Hosting
	+ The Cloud
	+ Webservers and Clients
* Star and Mesh network topologies
 | **Introduces:** * The use of basic string manipulation
* The use of basic file handling operations:
	+ Open
	+ Read
	+ Write
	+ Close
* The use of records to store data
* The use of SQL to search for data
* The use of arrays (or equivalent) when solving problems, including both one-dimensional (1D) and two-dimensional (2D) arrays
* How to use subprograms (functions and procedures) to produce structured code
* Random number generation
* Characteristics and purpose of different levels of programming language:
	+ High-level languages
	+ Low-level languages
* The purpose of translators
* The characteristics of a compiler and an interpreter
* Common tools and facilities available in an integrated development environment (IDE):
	+ Editors
	+ Error diagnostics
	+ Run-time environment
	+ Translators
 | **Introduces:** * The use of basic string manipulation
* The use of basic file handling operations:
	+ Open
	+ Read
	+ Write
	+ Close
* The use of records to store data
* The use of SQL to search for data
* The use of arrays (or equivalent) when solving problems, including both one-dimensional (1D) and two-dimensional (2D) arrays
* How to use subprograms (functions and procedures) to produce structured code
* Random number generation
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**Year 11**

| **Autumn 1**  | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| --- | --- | --- | --- | --- | --- |
| **Components covered:**1.5 – Systems software | **Components covered:**1.5 – Systems software | **Components covered:**1.6 – Ethical, legal, cultural and environmental impacts of digital technology | **Components covered:**2.1 – Algorithms | **Components covered:**Revision:Particular focus on exam technique and how to answer questions correctly. | **Components covered:** |
| **Sub-Topics:**1.5.1 Operating systems | **Sub-Topics:**1.5.2 Utility software | **Sub-Topics:**1.6.1 Ethical, legal, cultural and environmental impact | **Sub-Topics:**2.1.1 Computational thinking2.1.2 Designing, creating and refining algorithms2.1.3 Searching and sorting algorithms | **Sub-Topics:**Revision:Particular focus on exam technique and how to answer questions correctly. | **Sub-Topics:** |
| **Assessment:** End of unit tests.Practice exam questions  | **Assessment:** End of unit tests.PPE exams | **Assessment:** End of unit tests.Practice exam questions | **Assessment:** End of unit tests.PPE exams | **Assessment:** Practice exam questions on units 1 and 2 | **Assessment:**  |
| **Builds upon:** Parts of the Hardware and Networks unit covered in Year 8 | **Builds upon:** Parts of the Hardware and Networks unit covered in Year 8 | **Builds upon:** E-Safety lesson covered in KS3 | **Builds upon:** Python programming covered in year 7, 8 and 9 | **Builds upon:** Entire Computer Science course to date | **Build upon:**  |
| **Introduces:** * The purpose and functionality of operating systems:
	+ User interface
	+ Memory management and multitasking
	+ Peripheral management and drivers
	+ User management
	+ File management
 | **Introduces:** * The purpose and functionality of utility software
* Utility system software:
	+ Encryption software
	+ Defragmentation
	+ Data compression
 | **Introduces:** * Impacts of digital technology on wider society including:
	+ Ethical issues
	+ Legal issues
	+ Cultural issues
	+ Environmental issues
	+ Privacy issues
* Legislation relevant to Computer Science:
	+ The Data Protection Act 2018
	+ Computer Misuse Act 1990
	+ Copyright Designs and Patents Act 1988
	+ Software licences (i.e. open source and proprietary)
 | **Introduces:** * Principles of computational thinking:
	+ Abstraction
	+ Decomposition
	+ Algorithmic thinking
* Identify the inputs, processes, and outputs for a problem
* Structure diagrams
* Create, interpret, correct, complete, and refine algorithms using:
	+ Pseudocode
	+ Flowcharts
	+ Reference language/high-level programming language
* Identify common errors
* Trace tables
* Standard searching algorithms:
	+ Binary search
	+ Linear search
* Standard sorting algorithms:
	+ Bubble sort
	+ Merge sort
	+ Insertion sort
 | **Introduces:**  | **Introduces:**  |